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6.5 Sampling Containerized Material

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Sampling containerized materials presents a unique obstacle to field personnel, whether the container involved is a fiber drum or vacuum truck. Container staging, identification and opening are all issues to be considered. Health and safety precautions associated with sampling containerized materials are generally more stringent. Quality assurance guidelines for waste samples, as opposed to environmental samples are unique and each site should be considered individually. When sampling waste materials, high levels of contaminants can be expected. Therefore trip and field blanks may be inappropriate. However, if residual or low-level waste/chemicals are expected (e.g., sampling contaminated soils in drums or containers) trip and field blanks may be appropriate. Quality assurance requirements will be determined on a site by site basis by a NJDEP representative.

6.5.1 Drums, Bags, Sacks, Fiberdrums and Similar Small Containers

Prior to the initiation of the sampling event, all containers should be inventoried. All available information concerning each container should be recorded in the field logbook including the type of container, total capacity estimate, actual capacity (if container is open), markings, labels, color, origin, condition, etc. Photographs should be taken to provide a permanent record.

Depending on the location and position of the containers, it may be necessary to upright and/or relocate them prior to sampling. *Drums Containing Liquid Waste Can Be Under Pressure Or Vacuum. A Bulging Drum Should Not Be Moved Or Sampled Until The Pressure Can Be Safely Relieved.* Containers that can be moved should be positioned so that the opening or bung is upright (if the integrity of the container will allow). Containers should not be stacked.

Next, the containers should be marked with an identification number for present and future reference. Enamel spray paint is often suitable for this purpose. Again, photographs of the numbered containers can prove valuable in documenting the containers' condition.

The procedure used to open a container will depend directly upon the container's condition. The sampling team leader should determine which drums will be opened using a remote opening device or penetrating apparatus. If such devices are used, an experienced operator must be employed and specific procedures for assuring health and safety must be clearly defined. All containers should be opened with utmost care. For drums, the bung opening should be loosened slowly with a non-sparking bung wrench. If the bung is badly rusted or frozen, it may be necessary to use a non-sparking hydraulic penetrating device. During container opening operations organic vapor concentrations should be monitored with portable instrumentation. Results should be recorded in the field logbook.

The integrity of the drums may dictate that overpacking is necessary prior to sampling, therefore overpack drums should be available.

6.5.1.1 Containerized Solids

The sampling of containerized solid materials (sludges, granular, powder) is generally accomplished through the use of one of the following samplers:

- · scoop or trowel
- waste pile sampler
- · sampling trier
- grain sampler

Once the container to be sampled is opened, insert the decontaminated sampling device into the center of the material to be sampled. Retrieve the sample and immediately transfer it into the

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sample bottle. If the sampling device is disposable, it may be left in the container sampled. Otherwise, decontaminate the device thoroughly before collecting the next sample. Each container should be sampled discretely. Depending on the objective of the sampling event (e.g., characterization for disposal) compositing of samples in the laboratory may be permissible. Compositing on a weight/weight or volume/volume basis will be made prior to analysis.

6.5.1.2 Containerized Liquids

The sampling of containerized liquids is generally accomplished through the use of one of the following samplers:

- COLIWASA
- · open tube sampler
- stratified sample thief (multiple liquid layer sampling)
- liquid/sludge sampler

Once the container to be sampled is opened, insert the decontaminated sampling device into the center of the liquid contents to be sampled. Retrieve the sample and immediately transfer it into the sample bottle. If the sampling device is disposable, leave it in the container sampled. Otherwise decontaminate the device thoroughly before collecting the next sample. It should be noted that dedicated laboratory decontaminated samplers offer the least potential for cross contamination. Each container should be sampled discretely. Depending on the objective of the sampling event (e.g., characterization for disposal) compositing of samples in the laboratory may be permissible. Compositing on a weight/weight or volume/volume basis will be determined prior to analysis.

6.5.2 Tanks, Vacuum Trucks, Process Vessels and Similar Large Containers

Prior to the initiation of the sampling event, all containers should be inventoried. All available information concerning each container should be recorded in the field logbook including type of container, total capacity estimate, actual capacity (if container is open), markings, labels, color, origin, condition, existence and condition of ladders and catwalks, etc. Each container should be marked with an identification number for present and future reference. Enamel spray paint is often suitable for this purpose. Photographs of the numbered vessels can prove useful in documenting the containers' condition and can provide a permanent record.

The procedure used to open a large containment vessel to provide access to its contents will vary with different containers. Most large tanks and vacuum trucks will have valves near the bottom of the tank and hatches near the top. It is most desirable to collect samples from the top of a tank for several reasons. The integrity of valves near the bottom of the tank cannot be assured. The valve may be immobile or may break or become jammed in the open position resulting in the uncontrolled release of the tank's contents. Secondly the contents of a large vessel may become stratified. Collecting a sample from the bottom will not permit the collection of a sample of each stratum. Instead a cross-sectional sample of the tank's contents should be obtained from the top access.

In opening and sampling larger containment vessels precautions must be considered to assure personal health and safety. Accessing storage tanks requires a great deal of manual dexterity. It usually requires climbing to the top of the tank through a narrow vertical or spiral stairway while wearing protective gear and carrying sampling equipment. At least two persons must always perform the sampling: One to open the hatch and/or collect the actual samples, and the other to stand back, usually at the head of the stairway and observe, ready to assist or call for help.

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Prior to opening the hatch, the sampler should check the tank for a pressure gauge. If necessary, the release valve should be opened slowly to bring the tank to atmospheric pressure. If the tank pressure is too great or venting releases gas or vapor, discontinue venting immediately. Measure releases to the atmosphere with portable field instrumentation and record in field logbook.

If no release valve exists, slowly loosen hatch cover bolts to relieve pressure in the tank. Again, stop if pressure is too great or if a release occurs. Do not remove hatch cover bolts until tank is at atmospheric pressure.

If a discharge to ambient air occurs, sampling may need to be postponed until the proper equipment is available to control the release.

Once the tank has been stabilized, sample collection may begin using one of the previously recommended samplers for containerized liquids and solids and employing the proper safety precautions and backup personnel. If the contents of the tank have stratified, each stratum should be sampled discretely. At a minimum, a top, middle and bottom sample should be collected. If the container has separate compartments, each should be sampled separately at varying depths, as required. Depending on the objective of the sampling event (e.g., characterization for disposal) compositing of samples in the laboratory may be permissible. Compositing on a weight/weight or volume/volume basis will be determined prior to analysis.

Upon retrieval, immediately transfer the sample into the sample bottle. If the sampling device is disposable, it may be left in the container sampled. Otherwise the device must be thoroughly decontaminated before collecting the next sample.

6.5.3 Transformers

The peculiarities that are associated with transformers warrant that these containers be considered separate from drums and tanks. Because transformers are often located in secured, out-of-the-way locations, access may present a problem. For pole mounted transformers a power operated scissors lift or cherry picker may be needed. In other cases the transformer may be in an underground cell.

The toxic nature and degree of hazard posed by PCBs which may be present in a transformer dictate that a high level of caution be used. Sampling and support personnel should wear appropriate protection. Spill prevention and control must be planned; plastic sheeting and sorbent pads should be employed. And most importantly, the transformer must be certified as "off-line" and denergized by an electrician or other responsible person.

Once the power source to the transformer is cut and spill control measures (plastic sheeting on ground and/or floor surface of lift) are in place, the cover of the transformer can be removed with hand tools. A sample of the dielectric fluid is most efficiently obtained with a disposable glass COLIWASA.

In order to obtain a representative sample, lower this device at a rate that allows the levels of the fluid inside and outside the sampler to remain the same. When the sampler reaches the bottom of the transformer, close it and as it is retrieved, wipe the COLIWASA with a disposable absorbent pad. Transfer the sample directly into the sample bottle. If a disposable sampling device is used, and if the transformer is out of service, it may be possible to leave the used sampler in the sampled materials. However this should only be done after consultation with the responsible authorities. Otherwise the sampler should be drummed along with protective clothing, sheeting and absorbent pads, and disposed of at a pre-determined approved location.

The transformer drain valve should never be utilized for sample collection for several reasons. The integrity of these valves cannot be assured. The valve may be rusty, may break or may become

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jammed in the open position resulting in the uncontrolled release of the transformer's contents. Secondly, it is likely that transformer contents may have stratified. Since PCBs are heavier than other insulating oils this stratification may prevent the collection of representative samples. Samples obtained from the valve near the bottom of the transformer might reveal higher PCB concentrations than the true concentration of the total dielectric fluid.

6.6 Waste Pile Sampling

This recommended protocol outlines general procedures for collecting samples from waste piles and other waste materials, equipment necessary for sampling, and the adequate representation of the material. Also presented will be necessary factors for consideration when formulating a sampling plan. Because of the variables involved in waste material sampling, including shape and size of piles; size, compactness and structure of the waste material; and make-up throughout the material, exact procedures cannot be outlined for every sampling situation. Considerations must be made for the above mentioned variables, the purpose of sampling, and the intended use of the data to help determine correct sampling methodology.

6.6.1 Considerations for the Sampling Plan

The physical and chemical make-up of the waste pile and the purpose of sampling should be considered in planning for the sampling event. Information about these items is presented below. Also refer to the discussion on composite sampling in Section 6.1.2.2. of this chapter.

6.6.1.1 Shape and Size

Shape and size of waste material and waste piles may vary greatly in a real extent and height. The pile may be cone shaped, long and rectangular, square, oval or irregularly shaped. State and federal regulations often require a specified number of samples per volume of waste, therefore size and shape must be used to calculate volume and to plan for the correct number of samples. Shape must also be considered when planning physical access to the sampling point and the type of equipment necessary to successfully collect the sample at that location.

6.6.1.2 Characteristics of the Material

6.6.1.2.1 Type of Material

Material to be sampled may be homogeneous or heterogeneous. Homogeneous material resulting from known situations (e.g., process wastes) may not require an extensive sampling protocol if the material remains homogeneous. Heterogeneous and unknown wastes require more extensive sampling and analysis to ensure the different components are being represented.

6.6.1.2.2 Chemical Stability

Waste materials may be affected by their inherent chemical stability. Exposure to the elements and leaching over time may cause older material to differ in chemical composition from newly deposited material in the same pile. Heterogeneous material may undergo chemical reactions resulting in pockets or layers of different compounds.

6.6.1.2.3 Particle Size

The particle size of the material affects sampling by preventing certain volumes from being analyzed. Large chunks of material, which are left behind and not sampled, may result in positive or negative bias of contaminants in samples. If it is necessary

to sample larger material, provisions must be made in the planning stage to render the larger material capable of producing a sample.

6.6.1.2.4 Compactness/Structure of Material

The compactness/structure of the material may vary across the diameter of the pile. The material may range from monolithic to free flowing, and of a consistency from muddy to compact and dry. This should be considered when planning sampling procedures.

6.6.1.3 Purpose of Sampling

During the investigation of a site, areas of waste materials or waste piles are often encountered. For complete evaluation of a site, these areas must be characterized. Often information about the waste is available, thus providing insight to its chemical composition. If sufficient information is known about the process generating the waste and it is homogeneous, sampling may not be required for classification. However, for verification of that information, or when no information is available about the nature of the material, the involved Site Remediation Program in NJDEP will direct the first round of sampling for analysis of the waste. This can be performed at or about the same time as the first round of sampling for the rest of the site. From the analytical data generated, two scenarios are commonly encountered: contaminant concentrations below specific action levels which usually allows the material to remain on site after delineation; or contaminant concentrations above action levels requiring additional evaluation of the waste.

When additional evaluation is required, the next step is to determine whether a material is a hazardous waste in accordance with New Jersey Administrative Code (N.J.A.C.) 7:26G et. seq. This is performed under the direction of NJDEP and the Division of Solid and Hazardous Waste/Bureau of Resource Recovery and Technical Programs, which promulgates the requirements necessary to render a waste classification. The main objective at this point is to quantify the contaminants of concern, to look for the presence of wastes listed in N.J.A.C. 7:26G et. seq. and look for any other characteristics that would give reason to consider the waste hazardous.

After the waste has been classified as hazardous, additional sample points and analysis for a wide range of parameters is usually required. The sampling scheme should address delineation of the extent of hazardous material exceeding clean-up criteria. It should characterize waste with contaminant concentrations above a specific, significant level but below removal criteria which may be removed to another approved facility, remain on site after risk assessment, or undergo some other form of remediation such as on-site treatment.

6.6.2 Sampling Procedures

As with soil sampling, waste pile samples can be collected at the surface or at depth, and different equipment is required in each instance. Surface samples can be collected most efficiently with a trowel or scoop. For samples at depth, a decontaminated bucket auger may be required to advance the hole, then another decontaminated auger used for sample collection. For a sample core, waste pile samplers or grain samplers may be used.

Waste pile sampling is generally accomplished through the use of one of the following samplers:

- · scoop or trowel
- waste pile sampler
- sampling trier
- · soil auger

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- grain sampler
- split spoon sampler
- · soil coring device

6.6.2.1 Surface

At the desired location, clear surface debris. Collect the adequate volume of waste from a depth of 0-6 inches using a trowel, scoop or auger. For a core sample from the surface use the waste pile sampler, trier, or other listed corer/sampler. Transfer the sample directly into the sample container, or use a decontaminated trowel or spatula for transfer if necessary. A wide mouth bottle is preferable for containing the sample, as it requires less disturbance of the sample transferred into the bottle.

6.6.2.2 At Depth

At the sampling location, advance the hole to the desired sampling depth with a decontaminated bucket auger or power auger. Use another decontaminated bucket auger or corer/sampler to collect the sample, and, if necessary, a decontaminated spatula to transfer the sample into the sample bottle. For samples greater than three feet, a hand operated hammer and extension rod may be utilized with a split spoon for sample collection. Upon retrieval the split spoon should be opened, its contents logged if necessary, and immediately transferred into a sample bottle using a decontaminated spatula or spoon.

6.6.3 Required Analytes and Frequency

6.6.3.1 Waste Classification

Requirements to render a waste classification pursuant to N.J.A.C.7:26G et. seq. are promulgated by the Division of Solid and Hazardous Waste. The applicable requirements, in terms of frequency of sample, analysis and quality assurance are specified in the, *Guidance Document for Waste Classification*. This document is available from the Bureau of Resource Recovery and Technical Programs within the above noted Division and is also available at http://www.state.nj.us/dep/dshw/rrtp/index.htm.

The requirements consist of a sampling plan and an analytical test of the material. The sampling plan specifies the number of samples to be taken per volume of waste. Required analyses include RCRA characteristics, total petroleum hydrocarbons (TPHC) content and total polychlorinated biphenyl (PCB) content. Further details on the testing requirements and for the development of a site-specific sampling plan can be obtained from the Bureau of Resource Recovery and Technical Programs.

6.6.3.2 Quality Assurance

For the purpose of analytical quality assurance, the NJ Laboratory Certification Program must certify the laboratory performing the requested analysis for that specific contaminant or parameter. The analytical results and the corresponding detection limits must be submitted on the stationary of the laboratory performing the analysis with the laboratory's certification ID number. Chain of custody and quality control procedures as specified by EPA SW-846 3rd (or most recent) Edition must be submitted along with analytical results.

6.6.3.3 Characterization

When the material that is being evaluated to determine if it can be left on site, then the considerations previously mentioned in this section should be used to plan a sampling strategy. The

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characterization may require one or several phases of sampling, but the first phase should be positively biased or statistically random.

Once contaminants of concern have been identified and quantified, additional sampling and analysis may be necessary. Due to the site specific aspects of waste pile sampling and the various reasons for which it is performed, the number of required samples and analytes should be determined by the personnel accumulating the data and directing the investigation from the NJDEP Site Remediation Program.

If the materials to be characterized are excavated soils, a guidance document entitled *Guidance Document for the Remediation of Contaminated Soils* can be otained from the NJDEP Maps and Publications office at 609-777-1038. This document provides guidance on the evaluation of soils in order to determine their regulatory status and recommends appropriate sampling in support of the determinations.

If the party desires to obtain a Certificate of Authority to Operate (CAO) for a beneficial use project, contact the Bureau of Resource Recovery and Technical Programs at 609-984-6985. The CAOs are issued pursuant to N.J.A.C. 7:26-1.7(g) for the beneficial use of materials which otherwise must be disposed of as waste. For Beneficial Use Determinations (BUD), the material must normally be sampled at a rate of one sample per five hundred (500) cubic yards of the material. To obtain a representative sample, the material must be divided into grids and each grid must represent no more than twenty (20) cubic yards of material.

6.7 Surficial Sampling

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This recommended protocol outlines procedures and equipment for the collection of representative wipe, chip and sweep samples.

Surficial sampling is used to assess the existence and/or extent of contamination on various surfaces rather than in a soil, water or air matrix. For example, collecting wipe samples of the process vessels and interiors of ventilation ducts may assess the interior of a building. Though all three types of samples are for similar purposes, the three types of sampling are performed in very different ways because they are intended to assess different surface areas.

6.7.1 Wipe Samples

This method of monitoring surficial contamination is intended for non-volatile species of analytes (e.g., PCB, TCDD, and TCDF) on non-porous surfaces (e.g., metal, and glass). Sample points should be carefully chosen and should be based on site history, manufacturing processes, personnel practices, obvious contamination, migration pathways and available surface area. Suggested sampling points include process vessels, ventilation ducts and fans, exposed beams, windowpanes, etc. The area wiped should be large enough to provide a sufficient amount of sample for analysis (smaller sample volumes cause higher detection limits).

To collect a wipe sample the following equipment is needed:

- a ruler or measuring tape to measure out the area being wiped
- disposable surgical gloves, to be changed prior to handling clean gauze, sample container or solvent
- sterile, wrapped gauze pad (3 in. x 3 in.)
- appropriate pesticide grade solvent or distilled and deionized water

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To facilitate the collection of a wipe sample, 3 in. x 3-in. gauze should be utilized. The use of filter paper for wipe sampling is not recommended. Filter paper will tend to rip and crumble if the surface wiped is slightly rough. If filter paper is to be used, it should be four-inch diameter heavy gauge paper, such as Whatman #4 Filter Paper.

The solvent of choice may change based upon the analytes of interest and surface being sampled. Gauze pads for semi-volatiles, pesticide and PCB samples should be moistened in a 1:4 acetone/ hexane mixture and those for metals with distilled and deionized water. The gauze pad should be soaked and excess squeezed out immediately before the collection of each sample. Use of presoaked pads is not acceptable. Alternate solvents may be acceptable for certain parameters, however, their approval for use will be at the discretion of NJDEP.

Occasionally samples are desired from painted or waxed surfaces. Since hexane may degrade the finish or pick up interfering substances, an alternate solvent should be used. In this case, methanol or distilled/deionized water for semi-volatiles, pesticides and PCB's and distilled and deionized water alone for metals should be used. Surface interference should be recorded in the field logbook.

Once the sample location has been determined, sample collection can begin. It is recommended that an area be premeasured (e.g. 25 cm x 25 cm) to allow for easier calculation of final results. However, this is not always feasible and may be done after area is wiped. Wearing a new pair of disposable surgical gloves, remove the gauze pad from its sterile wrapping and soak it with the appropriate solvent. Wipe entire area to be sampled once in the horizontal direction and once in the vertical direction, applying moderate pressure. Wipe the entire area so that all the sample material is picked up. Place the gauze pad into the sample container.

A blank must always be collected for each wipe-sampling episode in order to ensure the quality of the data. This blank will help to identify potential introduction of contaminants from the pad, solvent, sample container or ambient air conditions. To perform a wipe blank, start by wearing new gloves, then wet a gauze pad with the solvent or water (for each collection parameter) and place the pad directly into the sample bottle.

When samples are submitted for analysis, the laboratory should be told to rinse the sample jars with the appropriate extraction or digestion solvent, depending on the analysis to be performed, when transferring sample to the extraction glassware. This will ensure that the entire sample has been removed from the container.

6.7.2 Chip Samples

This method of monitoring surficial contamination is intended for non-volatile species of analytes (e.g., PCB, TCDD, and TCDF) on porous surfaces (e.g., cement, brick, wood). Sample points should be carefully chosen and should be based on site history, manufacturing processes, personnel practices, obvious contamination and available surface area. Suggested sampling points include floors near process vessels and storage tanks, loading dock areas, etc. The sampling area should be large enough to provide a sufficient amount of sample for analysis (smaller sample volumes cause higher detection limits). To facilitate the calculations once the analytical data is received, the area sampled should be measured. To collect a chip sample, the following equipment is needed:

- a ruler, or measuring tape to measure out area to be sampled
- disposable surgical gloves, to be changed prior to collection of each sample

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- decontaminated chisel of borosilicate construction and hammer or electric hammer
- dedicated natural bristle brush and a dust pan lined with aluminum foil or one that is dedicated, decontaminated and constructed of a pre-approved material which will not interfere with the contaminants of concern
- container for sample

Once the sample location has been determined and marked off, sample collection can begin. Wearing a new pair of disposable gloves, and using a decontaminated chisel and hammer, break up the surface to be sampled. An effort should be made to avoid scattering pieces out of the sampling area boundary. Any pieces that fall outside the sampling area should not be used. The area should be chipped to less than one-quarter inch (preferably 1/8 in.). Record how deep chips were taken. Collect the chipped pieces using a dedicated, decontaminated dustpan and natural bristle brush and transfer the sample directly into the bottle.

6.7.3 Sweep Samples

This method of monitoring surficial contamination is intended for non-volatile species of analytes (e.g., PCB, TCDD, TCDF) in residue found in porous (e.g., asphalt) or non-porous (e.g., metal) surfaces. Sweep sampling allows collection of dust/residue samples that may help in the assessment of contaminant determination and delineation. Sample points should be carefully chosen and should be based on site history, manufacturing processes, personnel practices, obvious contamination, migration pathways and available surface area.

Suggested sampling points include ventilation systems where dust can collect, floor surfaces near process vessels and storage tanks, or street gutters where contaminated sediments may have migrated and accumulated. The area sampled should be large enough to provide a sufficient amount of sample for analysis. Keep in mind that on linoleum floors a solvent cannot be used or too much residue may exist for a wipe sample to be easily collected.

To collect a sweep sample the following equipment is needed:

- dedicated natural bristle brush
- decontaminated stainless steel spatula and/or a dustpan lined with aluminum foil, or one that is dedicated, decontaminated and constructed of a pre- approved material which will not interfere with the contaminants of concern
- disposable dedicated surgical gloves to be changed prior to collection of each sample.
- container for sample

Once the sample location has been determined, sample collection can begin. Wearing a new pair of disposable gloves, sweep all residue in the area to be sampled onto a decontaminated or dedicated dustpan or directly into the sample container. A decontaminated or dedicated spatula may be used to aid in transferring the sample into the sample bottle.

6.7.4 Rinsate Samples

This method of sampling is utilized to determine if surfaces contain hazardous waste residual after being cleaned. It is normally associated with drum storage pads, floors of buildings and the inside of waste tanks.

Collecting the water from the last rinse when cleaning a tank or surface area constitutes the Rinsate sample. This water, which is normally potable water, is then analyzed and compared against a blank consisting of the same type of water.